



ELECTRONIC CAMERA SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims benefit of Japanese Applications No. Hei 11-156557 filed in Japan on June 3, 1999 and No. Hei 11-156558 filed in Japan on June 3, 1999, the contents of which are incorporated by this reference.

BACKGROUND OF THE INVENTION

10 The present invention relates to an electronic
camera using a memory card as a recording medium.

For electronic cameras which are being popular in recent years, the image quality, i.e., the number of pixels constructing image data has greatly improved along with development of CCD image sensing elements. Accordingly, the data amount per image data is increasing.

A current electronic camera which uses a memory card with a nonvolatile flash ROM as a mainstream recording medium has a limited recording capacity. For this reason, memory cards with larger capacities have been sequentially developed and are commercially available.

Under these circumstances, an electronic camera
25 having, in place of a memory card, a hard disk device
or magnetooptical disk device capable of recording
a larger quantity of image data has been proposed.

However, an electronic camera having a hard disk device or magnetooptical disk device has the following problem. Since the recording medium has a rotating member, power is required to rotate the recording medium for recording/reproduction, and a battery with a larger capacity is indispensable although the recording medium itself can be made compact to some extent and also incorporated in the camera body. As a result, the entire electronic camera becomes so bulky that it is unsuitable for a compact electronic camera which is easy to carry.

BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to provide an electronic camera selectively usable in accordance with a situation, which allows a user to easily carry only the camera body as a compact electronic camera or sense high-quality image data and record it on a large-capacity recording medium.

According to the first aspect of the present invention, there is provided an electronic camera system comprising a first recording medium receiving portion provided in an electronic camera to receive a first recording medium for recording image data, a second recording medium receiving portion for receiving a second recording medium having a recording capacity larger than that of the first recording medium, a first power supply provided in the electronic

camera to supply power in writing the image data on at
least the first recording medium, a second power supply
having a power supply capacity larger than that of
the first power supply, and an electronic camera
5 expansion unit for receiving the second power supply,
the electronic camera expansion unit being detachable
from the electronic camera, wherein the second power
supply supplies power to write data on the second
recording medium when the electronic camera expansion
10 unit is attached to the electronic camera.

According to the second aspect of the present
invention, in the invention according to the first
aspect, there is provided an electronic camera system
further comprising determination means for determining
15 whether the electronic camera expansion unit is
attached to the electronic camera, and notification
means for, when the second recording medium is inserted
into the second recording medium receiving portion, and
the determination means determines that the electronic
20 camera expansion unit is not attached to the electronic
camera, notifying a user that the electronic camera
expansion unit is not attached to the electronic
camera.

According to the third aspect of the present
25 invention, in the invention according to the first
aspect, there is provided an electronic camera system
further comprising determination means for determining

whether the electronic camera expansion unit is
attached to the electronic camera, and means for, when
the determination means determines that the electronic
camera expansion unit is not attached to the electronic
camera, inhibiting drive of the second recording medium
and a write/read of image data.

According to the fourth aspect of the present
invention, in the invention according to the first
aspect, there is provided an electronic camera system
wherein the electronic camera expansion unit comprises
a grip portion incorporating the second power supply,
and a substantially plate-like flat portion having an
end face integrated with the grip portion, and attached
to a bottom surface of the electronic camera.

According to the fifth aspect of the present
invention, in the invention according to the first
aspect, there is provided an electronic camera system
wherein the electronic camera further comprises a first
power supply receiving portion for receiving the first
power supply, the electronic camera expansion unit
further comprises a unit main body, a second power
supply receiving portion for receiving the second power
supply, an attaching mechanism for detachably attaching
the unit main body to the electronic camera, and data
connection means, electrically connected to the
electronic camera, for transmitting/receiving the image
data, and the second recording medium receiving portion

is provided in the unit main body.

According to the sixth aspect of the present invention, in the invention according to the first aspect, there is provided an electronic camera system wherein the unit main body comprises a grip portion incorporating the second power supply receiving portion and arranged on an end portion side in a horizontal direction of the electronic camera, and a substantially plate-like flat portion integrated with an end portion of the grip portion and attached to a bottom surface of the electronic camera, and incorporating the second recording medium receiving portion and having the data connection means formed at an abutment portion against the bottom surface of the electronic camera.

According to the seventh aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the second recording medium has a rotating member, and the second recording medium receiving portion is arranged on a side of the grip portion of the flat portion.

According to the eighth aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the flat portion has, at a position separated from the grip portion via the second recording medium receiving portion, a circuit section for executing

5 According to the ninth aspect of the present
invention, in the invention according to the sixth
aspect, there is provided an electronic camera system
wherein the electronic camera has a cover for
protecting an insertion port of the first recording
10 medium into the first recording medium receiving
portion, and the grip portion has a recessed portion
not to impede opening/closing the cover.

According to the 10th aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the grip portion has, at an upper portion, a release switch for instructing a release operation in the electronic camera.

According to the 11th aspect of the present invention, in the invention according to the fifth aspect, there is provided an electronic camera system wherein the second recording medium can be freely removed from the second recording medium receiving portion, and the second recording medium receiving portion is arranged at a portion where the second recording medium can be removed even while the unit main body is being attached to the electronic camera.

According to the 12th aspect of the present invention, in the invention according to the fifth aspect, there is provided an electronic camera system wherein the attaching mechanism has a screw threadably engaging with a tripod screw hole of the electronic camera, and the connection means has a plurality of contacts disposed on a circumference centered on the screw.

According to the 13th aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the flat portion has, at positions corresponding to the plurality of contacts forming the connection means, a circuit section for executing the write/read of the image data on/from the second recording medium and transmission/reception of the image data through the connection means by power supplied from the second power supply.

According to the 14th aspect of the present invention, in the invention according to the fifth aspect, there is provided an electronic camera system wherein the unit main body further comprises a switch for inhibiting the write/read of the image data on/from the second recording medium.

According to the 15th aspect of the present invention, in the invention according to the fifth aspect, there is provided an electronic camera system

wherein the unit main body further comprises an input terminal for supplying external DC power to the power supply.

According to the 16th aspect of the present invention, in the invention according to the sixth aspect, there is provided an electronic camera system wherein the grip portion has a pair of members sandwiching the electronic camera from a front side and rear side, each of the pair of members having the second power supply receiving portion.

According to the 17th aspect of the present invention, in the invention according to the 16th aspect, there is provided an electronic camera system wherein the electronic camera has, on a rear surface side, a first image quality selection switch for switching image quality, one of the pair of members, which is located on the rear surface side of the electronic camera, covers the first image quality selection switch, and has a second image quality selection switch having an image quality selection position for simultaneously instructing priority recording on the second recording medium.

According to the 18th aspect of the present invention, in the invention according to the first aspect, there is provided an electronic camera system wherein the electronic camera comprises detection means for detecting an attached state of the electronic

camera expansion unit to the electronic camera, and
a first power supply receiving portion for receiving
the first power supply, and the electronic camera
expansion unit comprises the second recording medium
5 receiving portion, a second power supply receiving
portion for receiving the second power supply,
an attaching mechanism for attaching a unit main
body of the electronic camera expansion unit to
the electronic camera, and connection means,
10 electrically connected to the electronic camera,
for transmitting/receiving the image data.

According to the 19th aspect of the present
invention, in the invention according to the 18th
aspect, there is provided an electronic camera system
15 wherein the attaching mechanism has, on an abut surface
against the electronic camera, a projecting portion for
positioning the electronic camera, and the detection
means is arranged at a position corresponding to the
projecting portion to detect that the projecting
20 portion abuts.

According to the 20th aspect of the present
invention, in the invention according to the first
aspect, there is provided an electronic camera system
wherein the first recording medium comprises a memory
25 card, and the second recording medium comprises a hard
disk.

Additional objects and advantages of the invention

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BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

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FIG. 2A is a bottom view showing the camera body of the electronic camera according to the first embodiment.

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FIG. 3A is a perspective view showing the external

unit attached to the camera body of the electronic camera according to the first embodiment.

FIG. 3B is a bottom view showing the external unit attached to the camera body of the electronic camera according to the first embodiment.

FIG. 4 is a longitudinal sectional view showing the main part of the camera body and external unit in the first embodiment.

FIG. 5 is a longitudinal sectional view showing a detection section incorporated in the electronic camera according to the first embodiment.

FIG. 6 is a view showing contents displayed on an LCD panel.

FIG. 7 is a block diagram showing the schematic arrangement of hardware of the electronic camera according to the first embodiment.

FIG. 8 is a flow chart for explaining operation of the electronic camera according to the first embodiment.

FIG. 9A is a perspective view showing an electronic camera system according to the second embodiment of the present invention.

FIG. 9B is a perspective view showing the expansion unit of the electronic camera system according to the second embodiment of the present invention.

FIG. 9C is a perspective view showing a state

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FIG. 14 is a perspective view showing an electronic camera system according to the third embodiment of the present invention in which

FIG. 15A is a perspective view showing an electronic camera system according to the fourth embodiment of the present invention.

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FIG. 16B is a front view showing a second image quality selection switch.

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FIG. 20 is a flow chart for explaining operation of the electronic camera system according to the second embodiment of the present invention.

FIG. 21 is a flow chart for explaining operation of the electronic camera system according to the fourth embodiment of the present invention.

FIG. 22 is a flow chart for explaining operation of the electronic camera system according to the fourth embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

<First Embodiment>

FIGS. 1A to 5 are views showing an electronic camera 10 according to the first embodiment of the present invention. The electronic camera 10 comprises a camera body 20 and external unit 40.

As shown in FIG. 1A, a front surface 20a of the camera body 20 has an image sensing lens 21, an objective portion 22 of an optical viewfinder, an electronic flash 23, and a concave nail mark 29 as a hook position for opening a media slot cover 26 (to be described later).

A side surface 20b of the camera body 20 has a card slot (first recording medium receiving portion) 24, a card slot (second recording medium receiving portion) 25, and the media slot cover 26 covering the card slots 24 and 25, as shown in FIG. 2B. The card slots 24 and 25 are designed to freely detachably receive a memory card (first recording medium) M having a storage capacity of, e.g., 8 MB and an HDD pack H having a larger storage capacity of, e.g., 350 MB

than that of the memory card M, respectively. The HDD pack H uses a disk-like storage member as a recording medium.

5 An upper surface 20c of the camera body 20 has a release switch 27, and an LCD panel (notification means) 28 for indicating the state of the electronic camera 10 and the number of sensed images.

10 A bottom surface 20d of the camera body 20 has electric contacts 31 connected to connecting pins 58 (to be described later), a hole portion 32 for receiving a positioning pin 52 (to be described later), and a tripod screw hole 34, as shown in FIG. 2A. A battery cover 35 which is opened to exchange the battery is provided on the camera bottom surface 15 20d on the electronic flash side.

20 The camera body 20 incorporates a battery chamber for accommodating, inside the battery cover 35, a battery B (first power supply) for supplying power to the entire camera body 20, a detection switch (detection means) 33 which is provided inside the hole portion 32 and turned on when the positioning pin 52 is inserted, and a control circuit board 36 connected to the detection switch 33 to detect connection/disconnection of the external 25 unit 40. The control circuit board 36 also detects insertion/removal of the memory card M or HDD pack H into/from the card slot 24 or 25 and controls contents

displayed on the LCD panel.

As shown in FIGS. 3A and 3B, the external unit 40 comprises a plate-like flat portion 50 formed in correspondence with the bottom surface 20d of the camera body 20, and a grip portion 60 integrated with an end portion of the flat portion 50 and provided on the front surface 20a close to the side surface 20b of the camera body 20.

The flat portion 50 incorporates a circuit board 51. The upper surface of the flat portion 50 has the positioning pin 52 for fixing the connection position to the camera body 20, a tripod screw 53 threadably engaging with the tripod screw hole 34 of the above-described camera body 20, and the four connecting pins 58 electrically connected to the electric contacts 31 on the camera body 20 side.

As shown in FIG. 4, each connecting pin 58 has a flange portion 58a, and a distal end portion 58b inserted into a hole portion 55 formed in the upper surface of the flat portion 50. A compression coil spring 57 coaxial with the connecting pin 58 is inserted between the flange portion 58a and a convex portion 56 formed at a position opposing the hole portion 55 of the flat portion 50. Hence, the distal end portion 58b of the connecting pin projects from the upper surface of the flat portion 50 by a predetermined amount.

The flat portion 50 also has a DC inlet 59 to which an external power supply is connected.

5 The grip portion 60 has an outer shape easily gripped by the user. The grip portion 60 incorporates a battery pack 61. An upper surface 60a of the grip portion 60 has a release switch 62. A side surface 60b of the grip portion 60 has a recessed portion 63. The recessed portion 63 allows the user to open/close the media slot cover 26 even when the external unit 40
10 is attached to the camera body 20.

The electronic camera 10 with the above arrangement is used in the following way. The electronic camera 10 performs two operations: "normal mode" and "large-capacity mode". More specifically,
15 when the memory card M is inserted into the card slot 24 while the HDD pack H is not inserted into the card slot 25, the "normal mode" is set. In this mode, an image can be sensed like an ordinary electronic camera without attaching the external
20 unit 40.

When the HDD pack H is inserted into the card slot 25, this insertion is detected, and the "large-capacity mode" is set. In this case, since relatively high power is consumed especially
25 to start rotating the disk in the HDD pack H, the external unit 40 with the battery pack 61 having a large-capacity power supply must be attached.

suppress consumption of the battery B. More specifically, rotation of the disk-like storage member in the HDD pack H and image data write/read are inhibited.

5 FIG. 7 is a block diagram showing the schematic arrangement of hardware of the electronic camera according to the first embodiment. The same reference numerals as in FIGS. 1A to 6 denote the same parts in FIG. 7, and a detailed description thereof will be
10 omitted.

Referring to FIG. 7, a CPU 201 controls the entire camera 20. A memory card detection section 202 and HDD pack detection section 203 detect the memory card inserted into the card slot 24 and the HDD pack
15 inserted into the card slot 25, respectively, and output a detection signal to the CPU 201.

A controller 204 controls the data read/write from/to the memory card inserted into the card slot 24 or the HDD pack inserted into the card slot 25 on
20 the basis of a command from the CPU 201. The CPU 201 and controller 204 are mounted on the control circuit board 36.

As shown in FIG. 7, the battery pack 61 stored in the external unit 40 supplies power for driving the HDD
25 to the camera body 20 when the external unit 40 is attached to the camera body 20.

Operation of the above-described electronic camera

will be described below with reference to a flow chart shown in FIG. 8.

The CPU 201 determines first on the basis of a detection signal from the HDD pack detection section 203 whether the HDD pack is inserted into the card slot 25 (S1). If NO in step S1, it is determined next whether the memory card is inserted (S2). The memory card is detected on the basis of a detection signal from the memory card detection section 202.

If NO in step S2, i.e., when neither the memory card nor the HDD pack is inserted, the flow returns to step S1. If YES in step S2, the flow advances to an image sensing sequence (S3).

If YES in step S1, it is determined next whether the external unit is attached (S4). If YES in step S4, the flow advances to the image sensing sequence in step S3.

If NO in step S4, the CPU 201 displays "OP BAT" on the LCD panel 28, as shown in FIG. 6 (S5). Whether the external unit is attached is determined on the basis of a detection signal from the detection switch 33.

The CPU 201 instructs the controller 204 to inhibit use of the HDD (S6). Thus, a write/read to/from the HDD is not performed, and power consumption can be saved.

As described above, in the electronic camera 10 according to the first embodiment, when the HDD pack H

with large power consumption is inserted, the external unit 40 incorporating the large-capacity battery pack 61 need indispensably be attached. If the external unit 40 is not attached, the user is notified of it on the LCD panel 28 and prompted to attach the external unit 40.

If the external unit 40 is not attached while the HDD pack H is inserted, the function of the HDD pack H is stopped to avoid large consumption of the battery B.

In addition, since the grip portion 60 which is gripped in place of the camera body 20 when the external unit 40 is attached is provided, and the battery pack 61 as a heavy object is incorporated in the grip portion 60, the weight unbalance of the portable camera can be prevented.

The present invention is not limited to the above embodiment, and various changes and modifications can be made without departing from the spirit and scope of the present invention.

According to the electronic camera of the present invention, the following effects are obtained.

(1) When the second recording medium with large power consumption is inserted, the external unit incorporating the second power supply need indispensably be attached. If the external unit is not attached, the user is notified of it and prompted to attach the external unit.

(2) If the external unit is not attached while the second recording medium is inserted, the function of the second recording medium is stopped to avoid large consumption of the first power supply.

5 (3) Since the grip portion which is gripped in place of the camera body when the external unit is attached is provided, and the second power supply as a heavy object is incorporated in the grip portion, the weight unbalance of the portable camera can be
10 prevented.

<Second Embodiment>

FIGS. 9A to 13 are views showing an electronic camera system 310 according to the second embodiment of the present invention. The electronic camera
15 system 310 comprises an electronic camera 320 and expansion unit 340.

As shown in FIG. 9A, a front surface 320a of the electronic camera 320 has an image sensing lens 321, an objective portion 322 of an optical
20 viewfinder, an electronic flash 323, and a concave nail mark 324 as a hook position for opening a media slot cover 326 (to be described later).

A side surface 320b of the electronic camera 320 has a card slot (first recording medium receiving
25 portion) 325 and the media slot cover 326 covering the card slot 325. The card slot 325 is designed to freely detachably receive a memory card (first recording

medium) M having a storage capacity of, e.g., 8 MB.

An upper surface 320c of the electronic camera 320 has a release switch 327, and an LCD panel 328 for indicating the state of the electronic camera system 310 and the number of sensed images.

A bottom surface 320d of the electronic camera 320 has contacts 331 connected to connecting pins 356 (to be described later), a hole portion 332 for receiving a positioning pin 353 (to be described later), and a tripod screw hole 334, as shown in FIG. 9D. A battery cover 335 which is opened to exchange the battery is provided on the camera bottom surface 320d on the electronic flash side.

The electronic camera 320 incorporates a battery chamber for accommodating, inside the battery cover 335, a battery B (first power supply) for supplying power to the electronic camera 320, a detection switch (detection means) 333 which is provided inside the hole portion 332 and turned on when the positioning pin 353 is inserted, and a control circuit board 336 forming a control section connected to the detection switch 333 to detect connection/disconnection of the expansion unit 340. This control section also controls contents displayed on the LCD panel 328.

As shown in FIGS. 9B, 10A, and 10B, the expansion unit 340 comprises a plate-like flat portion 350 formed in correspondence with the bottom surface 320d of

the electronic camera 320, and a grip portion 360 integrated with an end portion of the flat portion 350 and provided on the front surface 320a close to the side surface 320b of the electronic camera 320.

5 The flat portion 350 incorporates an HDD pack receiving portion (second storage medium receiving portion) 351, and a circuit board 352 arranged on the opposing side of the grip portion 360 via the HDD pack receiving portion 351. The upper surface of the
10 flat portion 350 has the positioning pin 353, a tripod screw (attaching mechanism) 354 threadably engaging with the tripod screw hole of the above-described electronic camera 320, and the eight connecting pins 356 provided near the circuit board 352.

15 The HDD pack receiving portion 351 freely detachably receives an HDD pack (second recording medium) H as shown in FIG. 10C. The HDD pack H comprises a case Ha, a 50-pin connector Hb provided on a side surface of the case Ha, and a 1-inch hard disk
20 Hc connected to the connector Hb and accommodated in the case Ha.

 The HDD pack receiving portion 351 comprises a housing 351a, a connector 351b connected to the connector Hb of the HDD pack H, a support portion
25 351c for supporting the case Ha of the HDD pack H, projecting portions 351d provided in the housing 351a and engaged with engaging portions 351f (to be

described later), a protective cover 351e for protecting the HDD pack receiving portion 351, and the engaging portions 351f provided in the protective cover 351e and engaged with the above-described projecting portions 351d.

The protective cover 351e of the HDD pack receiving portion 351 allows the user to exchange the HDD pack H even when the expansion unit 340 is attached to the electronic camera 320.

As shown in FIG. 12B, each connecting pin 356 has a flange portion 356a, and a distal end portion 356b inserted into a hole portion 355a formed in the upper surface of the flat portion 350. A compression spring 355c coaxial with the connecting pin 356 is inserted between the flange portion 356a and a convex portion 355b formed at a position opposing the hole portion 355a of the flat portion 350. Hence, the distal end portion 356b of the connecting pin 356 projects from the upper surface of the flat portion 350 by a predetermined amount.

The connecting pins 356 have a function of electrically connecting the circuit board 352 to the control circuit board 336 of the electronic camera 320 and supplying power from the battery pack 361 to the electronic camera 320. When the connecting pins 356 and circuit board 352 are close to each other, the wire leading distance can be minimized.

The flat portion 350 has a DC inlet 357 connected to an external DC power supply such as an AC adapter, and an HDD switch 358 for turning on/off operation of the HDD pack H.

5 The grip portion 360 has an outer shape easily gripped by the user. The grip portion 360 incorporates a battery pack (second power supply) 361. An upper surface 360a of the grip portion 360 has a release switch 362. A side surface 360b of the grip portion
10 360 has a recessed portion 363. The recessed portion 363 allows the user to open/close the media slot cover 326 even when the expansion unit 340 is attached to the electronic camera 320.

Even when the expansion unit 340 is attached to
15 make it hard to operate the release switch 327 of the electronic camera 320, the same operability can be obtained because the grip portion 360 has the release switch 362.

The electronic camera system 310 with the
20 above arrangement is used in the following way. The electronic camera system 310 performs two operations: "normal mode" and "expansion mode". When the expansion unit 340 is not attached, the "normal mode" is set to sense an image like an ordinary
25 electronic camera.

When the expansion unit 340 is attached, the "expansion mode" is set. The expansion unit 340

is attached by screwing the tripod screw 354 of
the flat portion 350 into the tripod screw hole 334
of the electronic camera 320. At this time, the
positioning pin 353 is inserted into the electronic
5 camera 320 from the hole portion 332 to actuate
the detection switch 333. Thus, the control circuit
board 336 detects that the expansion unit 340 is
attached, and the "expansion mode" is set.

When the distal ends of the connecting pins 356
10 abut against the contacts 331, the connecting pins 356
are pressed downward against the spring force of
the compression springs 357. The connecting pins 356
and contacts 331 come into contact at a predetermined
contact pressure. Hence, power is reliably
15 supplied from the battery pack 361 to the electronic
camera 320 side, and the circuit board 352 and control
circuit board 336 are reliably connected to enable
transmission/reception of image data or release signal.

When the expansion unit 340 is attached, the HDD
20 switch 358 can be turned off to stop using the HDD
pack H. More specifically, rotation of the disk-like
storage member in the HDD pack H and image data
write/read are stopped. In this case, the expansion
unit 340 is used only as an expansion power supply
25 for supplying power from the battery pack 361 to
the electronic camera 320.

FIG. 18 is a block diagram showing the schematic

arrangement of hardware of the electronic camera system according to the second embodiment of the present invention. The same reference numerals as in FIGS. 9A to 13 denote the same parts in FIG. 18, and a detailed description thereof will be omitted.

Referring to FIG. 18, a CPU 501 of the electronic camera 320 controls the entire electronic camera 320. A memory card detection section 502 detects the memory card inserted into the card slot 325 and outputs a detection signal to the CPU 501.

A controller 503 controls the read/write from/to the memory card inserted into the card slot 325 on the basis of a command from the CPU 501. The CPU 501 and controller 503 are mounted on the control circuit board 336.

A CPU 511 of the expansion unit 340 controls the entire expansion unit 340. More specifically, the CPU 511 controls the write/read to/from the HDD inserted into the HDD pack receiving portion 351 and transmission of image data read out from the HDD to the electronic camera 320.

Image data read out from the HDD and control commands are transmitted through terminals 371 of the electronic camera 320 and terminals 372 of the expansion unit 340.

A controller 512 controls the HDD pack on the basis of a control command from the CPU 511.

The CPU 511 and controller 512 are mounted on the circuit board 352.

FIGS. 19 and 20 are flow charts for explaining operation of the electronic camera system according to the second embodiment of the present invention.

First, the CPU 501 determines on the basis of the detection signal from the detection switch 333 whether the expansion unit 340 is attached (S11). If YES in step S11, the flow advances to the expansion mode shown in FIG. 20.

In the expansion mode, it is determined first whether the HDD switch 358 which is provided in the expansion unit 340 to turn on/off operation of the HDD pack is ON (S21). The CPU 501 of the electronic camera is notified of the ON/OFF state of the HDD by the CPU 511 of the expansion unit through the terminals 371 and 372.

If YES in step S21, the flow advances to an expansion mode image sensing sequence (S22) and then returns to step S21. If NO in step S21, recording in the HDD is inhibited (S23). The flow advances to a normal mode image sensing sequence (S24) and then returns to step S21.

If NO in step S11, it is determined whether the memory card is inserted (S12). If YES in step S12, the flow advances to the normal mode (S13) and then returns to step S11.

If NO in step S12, a message representing that no medium is inserted is displayed (S14), and the flow returns to step S11.

Inhibition of recording in the HDD has been described above. Instead, use of the HDD may be inhibited by inhibiting a read from the HDD.

As described above, in the electronic camera system 310 according to the second embodiment, the stand-alone electronic camera 320 can be easily carried as a compact electronic camera. In addition, when the expansion unit 340 is attached to the electronic camera 320, the number of recordable images can be largely increased, and the electronic camera can be selectively used in accordance with requirements of a situation: for example, high-quality image data can be sensed and recorded on a large-capacity recording medium in the expansion unit 340, or the continuous operable time is prolonged.

In addition, since the grip portion 360 which is gripped in place of the electronic camera 320 when the expansion unit 340 is attached is provided, and the battery pack 361 as a heavy object is incorporated in the grip portion 360, the weight unbalance of the portable camera can be prevented.

Furthermore, when the HDD pack H having a rotating member easily affected by vibration is located on the grip portion 360 side where displacement due to

swing of the camera is relatively small, the influence of vibration caused by camera shake can be minimized.

Also, when the circuit section having a relatively high resistance to vibration is located on a side
5 separated from the grip portion 360, where displacement due to swing of the camera is large, the remaining members easily affected by vibration can be laid out close to the grip portion 360. Hence, the influence of vibration caused by camera shake can be minimized.

10 <Third Embodiment>

FIG. 14 is a perspective view showing an electronic camera system 370 according to the third embodiment of the present invention. The same reference numerals as in FIG. 9 denote the same
15 functional parts in FIG. 14.

The electronic camera system 370 is different from the above-described electronic camera system 310 in that the electronic camera system 370 uses an expansion unit 371 in place of the expansion
20 unit 340. The expansion unit 371 has a grip portion 372 shorter than the above-described grip portion 360. The grip portion (second power supply receiving portion) 372 incorporates a battery pack (second power supply) 373 having a smaller capacity than that of the
25 above-described battery pack 361. The grip portion 372 has no release switch.

The electronic camera system 370 can also obtain

the same effects as those of the above-described electronic camera system 310.

<Fourth Embodiment>

FIGS. 15A to 17B are views showing an electronic camera system 380 according to the fourth embodiment of the present invention. The same reference numerals as in FIG. 9 denote the same functional parts in FIGS. 15A to 17B.

The electronic camera system 380 comprises an electronic camera 390 and expansion unit 400.

A rear surface 390e of the electronic camera 390 has an eyepiece portion 392 of an optical viewfinder, as shown in FIG. 15A. An image quality selection switch 395 has two positions "HQ" and "NORMAL" which represent high-quality image recording in a memory card M and normal-quality image recording in the memory card M, respectively.

The electronic camera 390 incorporates a control circuit board 336 for controlling the entire electronic camera system 380, and a battery chamber (first power supply receiving portion) having a battery (first power supply) B for supplying power to the electronic camera 390. In the control circuit board 336, connection/disconnection of the expansion unit 400 is detected by a detection switch 333.

As shown in FIGS. 16A to 17B, the expansion unit 400 comprises a plate-like flat portion 410 formed

along a bottom surface 390d of the electronic camera 390, and a pair of grip portions 420 and 430 integrated with one end portion of the flat portion 410 and arranged to sandwich the electronic camera 390.

5 The flat portion 410 incorporates an HDD pack receiving portion (second storage medium receiving portion) 411, and a circuit board 352 arranged on an opposing side of the HDD pack receiving portion 411 via the pair of grip portions 420 and 430. The upper
10 surface of the flat portion 410 has a positioning pin 353, a tripod screw (attaching mechanism) 354 threadably engaging with a tripod screw hole 334 of the above-described electronic camera 390, and connecting pins 356 provided near the circuit
15 board 352.

 The flat portion 410 has a DC inlet 357 connected to an external DC power supply such as an AC adapter.

 The grip portions 420 and 430 have an outer shape easily gripped by the user. The grip portions 420
20 and 430 incorporate battery packs (second power supplies) 421 and 431, respectively, to increase the power supply capacity.

 An upper surface 420a of the grip portion 420 has a release switch 422.

25 Even when the expansion unit 400 is attached to make it hard to operate the release switch 327 of the electronic camera 390, the same operability can be

the "expansion mode" is set.

When the distal ends of the connecting pins 356 abut against the contacts 331, the connecting pins 356 are pressed downward against the spring force of the compression springs 357. The connecting pins 356 and contacts 331 come into contact at a predetermined contact pressure. Hence, power is reliably supplied from the battery packs 421 and 431 to the electronic camera 390 side, and the circuit board 352 and control circuit board 336 are reliably connected to enable transmission/reception of image data or release signal. The image quality in recording and selection of the recording medium are switched by the image quality selection switch 432.

FIGS. 21 and 22 are flow charts for explaining operation of the electronic camera system according to the fourth embodiment of the present invention.

As shown in FIG. 21, first, it is determined whether the expansion unit is attached (S31). If NO in step S31, it is determined next whether the memory card is inserted (S32).

If NO in step S32, neither the memory card nor the HDD pack is inserted, so a message representing that no medium is inserted is displayed on the LCD (S40), and the flow returns to step S31.

If YES in step S32, the flow advances to the normal mode (S33) to determine whether the release is

ON (S34).

If NO in step S34, the flow returns to step S31.
If YES in step S34, it is determined whether the image
quality selection switch 432 designates "HQ" (High
5 Quality) (S35).

If YES in step S35, a high-quality image is
recorded on the memory card (S36), and the flow returns
to step S31. If NO in step S35, it is determined
whether the image quality selection switch 432
10 designates "NORMAL" (S37).

If YES in step S37, a normal-quality image is
recorded on the memory card (S38), and the flow returns
to step S31. If NO in step S37, an error message is
displayed on the LCD (S39).

15 If YES in step S31, the flow advances to the
expansion mode shown in FIG. 22 to determine whether
the release switch is ON (S51).

If NO in step S51, the flow returns to step S31.
If YES in step S51, it is determined whether the image
20 quality selection switch 432 indicates "HQ" (S52).

If YES in step S52, a high-quality image is
recorded on the memory card (S53), and the flow returns
to step S31. If NO in step S52, it is determined next
whether the image quality selection switch 432
25 designates "NORMAL" (S54).

If YES in step S54, a normal-quality image is
recorded on the memory card (S55), and the flow returns

to step S31. If NO in step S54, it is determined next whether the image quality selection switch indicates "EXT HQ" (S56).

5 If YES in step S56, a high-quality image is recorded on the HDD (S57), and the flow returns to step S31. If NO in step S56, it is determined next whether the image quality selection switch 432 designates "EXT NORMAL" (S58).

10 If YES in step S58, a normal-quality image is recorded on the HDD (S59), and the flow returns to step S31. If NO in step S58, an error message is displayed on the LCD (S60).

15 As described above, the electronic camera system 380 according to the fourth embodiment can also obtain the same effects as those of the above-described electronic camera system 310.

20 When the expansion unit 400 also has the image quality selection switch 432, the quality of an image to be recorded can be switched, and the medium to record can be selected with the same operability as for the stand-alone electronic camera 390. When "HQ" or "NORMAL" is selected, recording in the HDD pack H is stopped. Hence, the expansion unit is used only as
25 an expansion power supply for supplying power from the battery packs 421 and 431 to the electronic camera 390. In addition, this system can cope with continuous image sensing for an enormous number of images because

the HDD pack H can be detachably exchanged.

The present invention is not limited to the above embodiment, and various changes and modifications can be made without departing from the spirit and scope of the present invention.

According to the electronic camera expansion unit of the present invention, the following effects are obtained. More specifically, when the expansion unit is attached, the electronic camera system can be more widely used as compared to the stand-alone electronic camera with a limited image data recording capacity or continuous operable time. When the expansion unit is detached, the portability improves.

Since the grip portion which is gripped in place of the electronic camera when the external unit is attached is provided, and the second power supply as a heavy object is incorporated in the grip portion, the weight unbalance of the portable electronic camera can be prevented.

When the second recording medium having a rotating member easily affected by vibration is located on the grip portion side where displacement due to swing of the electronic camera is relatively small, the influence of vibration caused by camera shake can be minimized.

Also, when the circuit section having a relatively high resistance to vibration is located on a side

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When a switch for inhibiting operation of

the second recording medium is provided, the expansion unit can also be used only as an expansion power supply for supplying power from the second power supply to the electronic camera. Additionally, DC power from
5 an AC adapter or the like can be received through line connection. Furthermore, the power supply capacity can further be increased by preparing a pair of grip portions sandwiching the electronic camera.

When the expansion unit has an image quality
10 selection switch, the image quality can be switched also in consideration of the second recording medium with the same operability as that of the electronic camera.

On the other hand, according to the electronic
15 camera system of the present invention, the following effects can be obtained. More specifically, when the expansion unit is attached, the electronic camera system can be more widely used as compared to the stand-alone electronic camera with a limited
20 image data recording capacity or continuous operable time. When the expansion unit is detached, the portability improves.

In addition, when the expansion unit is properly attached to the electronic camera by the projecting
25 portion for positioning, which is formed on the expansion unit side, attachment can be detected, and connection can be reliably done.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

WHAT IS CLAIMED IS:

1. An electronic camera system comprising:

a first recording medium receiving portion
provided in an electronic camera to receive a first
recording medium for recording image data;

a second recording medium receiving portion for receiving a second recording medium having a recording capacity larger than that of the first recording medium;

a first power supply provided in the electronic camera to supply power in writing the image data on at least the first recording medium;

a second power supply having a power supply capacity larger than that of said first power supply; and

an electronic camera expansion unit for receiving
said second power supply, said electronic camera
expansion unit being detachable from the electronic
camera,

wherein said second power supply supplies power to write data on the second recording medium when said electronic camera expansion unit is attached to the electronic camera.

2. A system according to claim 1, further comprising:

determination means for determining whether said electronic camera expansion unit is attached to

the electronic camera, and

notification means for, when the second recording medium is inserted into said second recording medium receiving portion, and said determination means

5 determines that said electronic camera expansion unit is not attached to the electronic camera, notifying a user that said electronic camera expansion unit is not attached to the electronic camera.

10 3. A system according to claim 1, further comprising:

determination means for determining whether said electronic camera expansion unit is attached to the electronic camera, and

15 means for, when said determination means determines that said electronic camera expansion unit is not attached to the electronic camera, inhibiting drive of the second recording medium and a write/read of image data.

20 4. A system according to claim 1, wherein said electronic camera expansion unit comprises

a grip portion incorporating said second power supply, and

25 a substantially plate-like flat portion having an end face integrated with said grip portion, and attached to a bottom surface of the electronic camera.

5. A system according to claim 1, wherein the electronic camera further comprises

a first power supply receiving portion for receiving said first power supply,

said electronic camera expansion unit further comprises

5 a unit main body,

a second power supply receiving portion for receiving said second power supply,

an attaching mechanism for detachably attaching said unit main body to the electronic camera, and

10 data connection means, electrically connected to the electronic camera, for transmitting/receiving the image data, and

said second recording medium receiving portion is provided in said unit main body.

15 6. A system according to claim 1, wherein said unit main body comprises

a grip portion incorporating said second power supply receiving portion and arranged on an end portion side in a horizontal direction of the electronic camera, and

20 a substantially plate-like flat portion integrated with an end portion of said grip portion and attached to a bottom surface of the electronic camera, and incorporating said second recording medium receiving portion and having said data connection means formed at

25 an abutment portion against the bottom surface of the electronic camera.

7. A system according to claim 6, wherein
said second recording medium has a rotating
member, and

5 said second recording medium receiving portion is
arranged on a side of said grip portion of said flat
portion.

8. A system according to claim 6, wherein said
flat portion has, at a position separated from said
grip portion via said second recording medium receiving
10 portion, a circuit section for executing the write/read
of the image data on/from the second recording medium
and transmission/reception of the image data through
said connection means by power supplied from said
second power supply.

15 9. A system according to claim 6, wherein
the electronic camera has a cover for protecting
an insertion port of the first recording medium into
said first recording medium receiving portion, and
said grip portion has a recessed portion not to
20 impede opening/closing said cover.

10. A system according to claim 6, wherein said
grip portion has, at an upper portion, a release switch
for instructing a release operation in the electronic
camera.

25 11. A system according to claim 5, wherein
the second recording medium can be freely
removed from said second recording medium receiving

portion, and

said second recording medium receiving portion is arranged at a portion where the second recording medium can be removed even while said unit main body is being attached to the electronic camera.

12. A system according to claim 5, wherein

said attaching mechanism has a screw threadably engaging with a tripod screw hole of the electronic camera, and

said connection means has a plurality of contacts disposed on a circumference centered on said screw.

13. A system according to claim 6, wherein said flat portion has, at positions corresponding to the plurality of contacts forming said connection means, a circuit section for executing the write/read of the image data on/from the second recording medium and transmission/reception of the image data through said connection means by power supplied from said second power supply.

14. A system according to claim 5, wherein said unit main body further comprises a switch for inhibiting the write/read of the image data on/from the second recording medium.

15. A system according to claim 5, wherein said unit main body further comprises an input terminal for supplying external DC power to said power supply.

16. A system according to claim 6, wherein said

grip portion has a pair of members sandwiching the electronic camera from a front side and rear side, each of said pair of members having said second power supply receiving portion.

5 17. A system according to claim 16, wherein
the electronic camera has, on a rear surface side, a first image quality selection switch for switching an image quality,

10 one of said pair of members, which is located
on the rear surface side of the electronic camera, covers said first image quality selection switch, and has a second image quality selection switch having an image quality selection position for simultaneously instructing priority recording on the second recording
15 medium.

18. A system according to claim 1, wherein
the electronic camera comprises
detection means for detecting an attached state of
said electronic camera expansion unit to the electronic
20 camera, and

a first power supply receiving portion for receiving said first power supply, and
said electronic camera expansion unit comprises
the second recording medium receiving portion,
25 a second power supply receiving portion for receiving said second power supply,
an attaching mechanism for attaching a unit main

body of said electronic camera expansion unit to
the electronic camera, and

connection means, electrically connected to the
electronic camera, for transmitting/receiving the image
5 data.

19. A system according to claim 18, wherein
said attaching mechanism has, on an abut surface
against the electronic camera, a projecting portion for
positioning the electronic camera, and

10 said detection means is arranged at a position
corresponding to the projecting portion to detect that
the projecting portion abuts.

20. A system according to claim 1, wherein the
first recording medium comprises a memory card, and the
15 second recording medium comprises a hard disk.

In an electronic camera system, a camera body includes a card slot for receiving a memory card M, a card slot for receiving an HDD pack H, and a battery chamber for receiving a battery B. An expansion unit includes a grip portion for receiving a battery back having a power supply capacity larger than that of the battery B, a detection switch for detecting the attached state of the expansion unit to the electronic camera, and an LCD panel for displaying a predetermined alarm message when the HDD pack H is inserted into the card slot, and the detection switch detects that the expansion unit is not attached to the electronic camera.

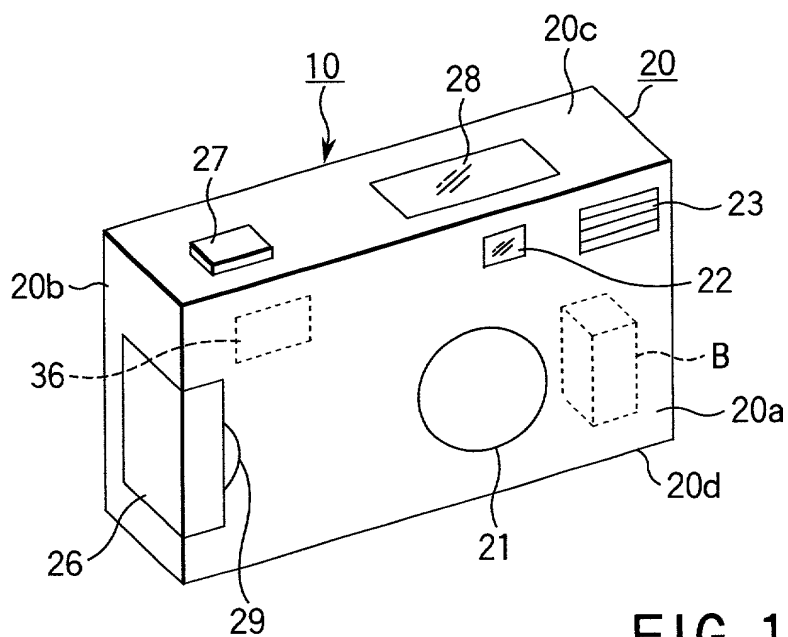


FIG. 1A

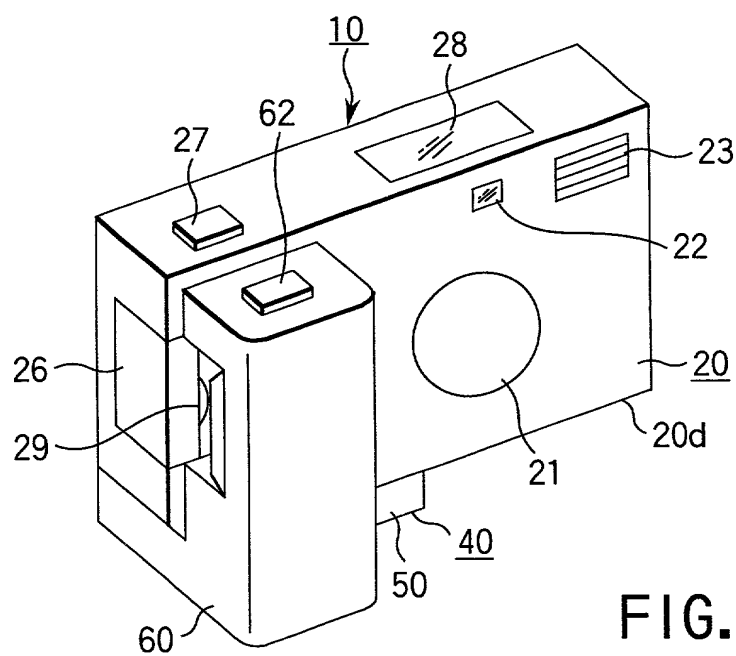


FIG. 1B

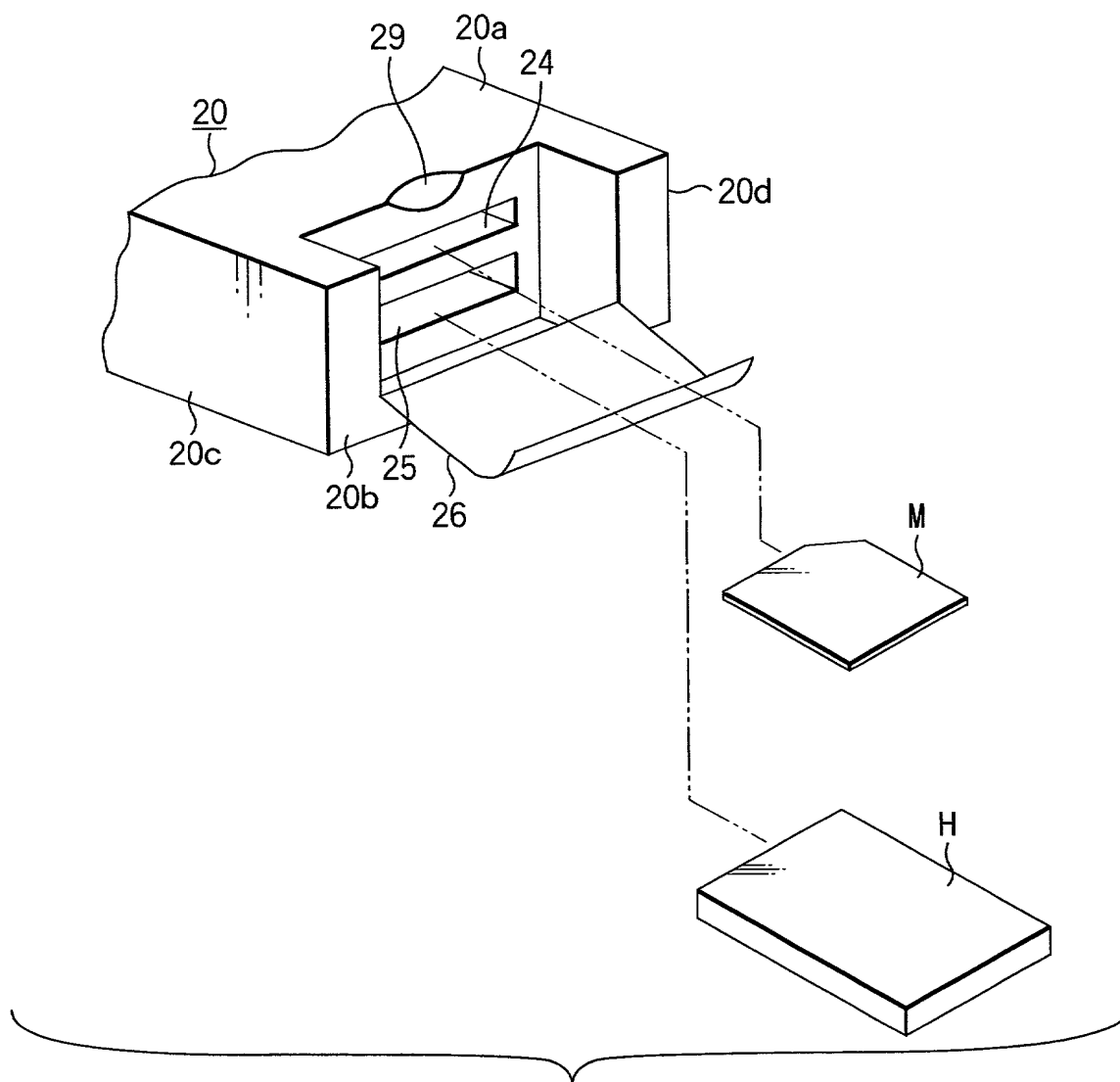
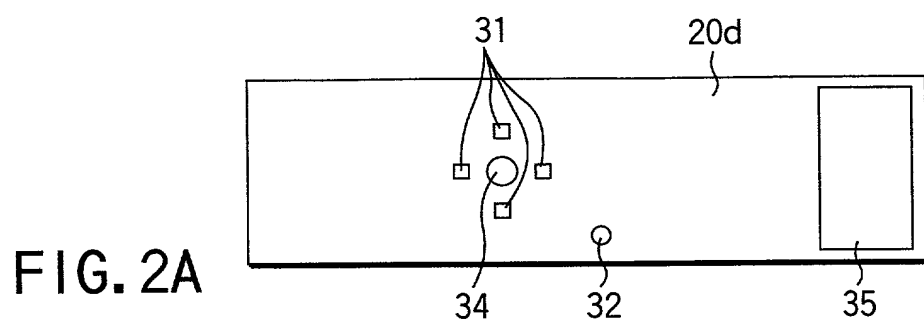
[illegible]

FIG. 2B

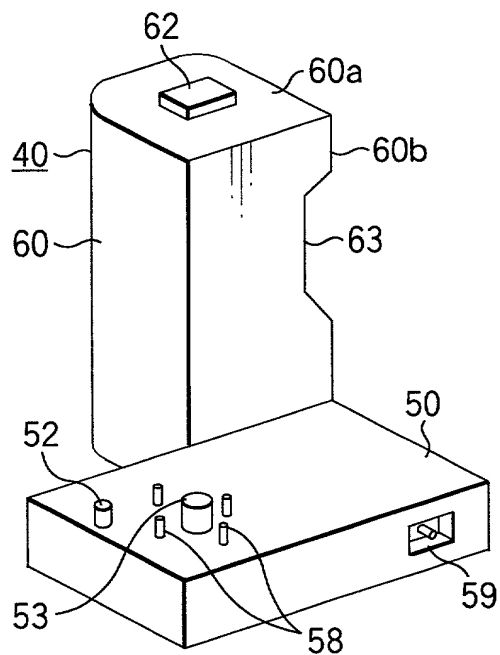


FIG. 3A

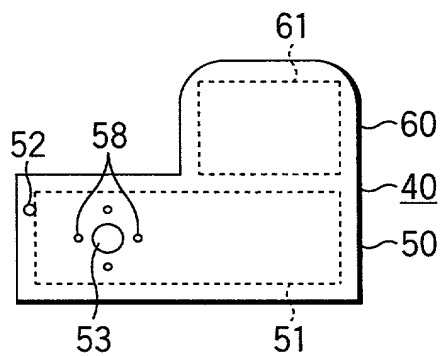


FIG. 3B

FIG. 6

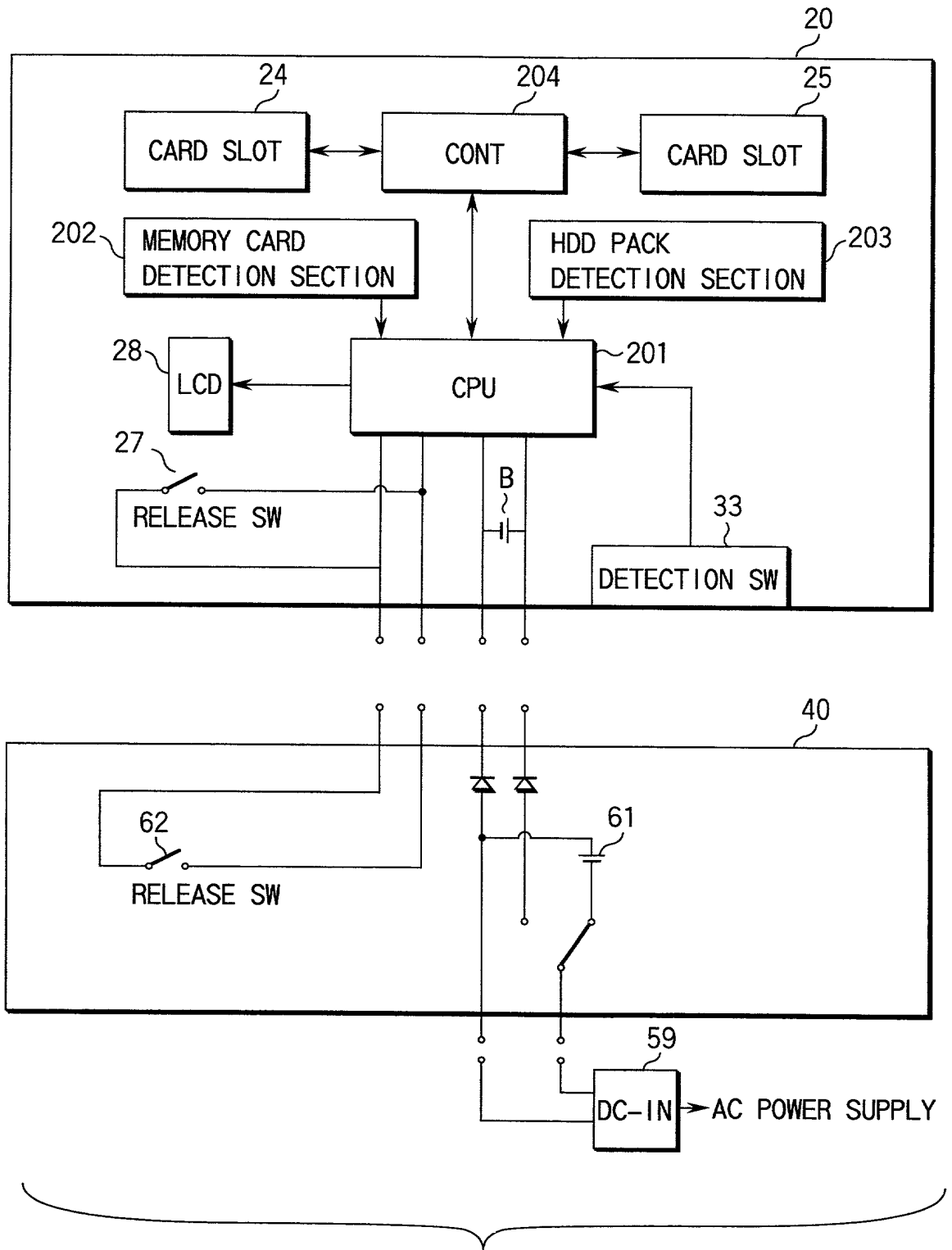


FIG. 7

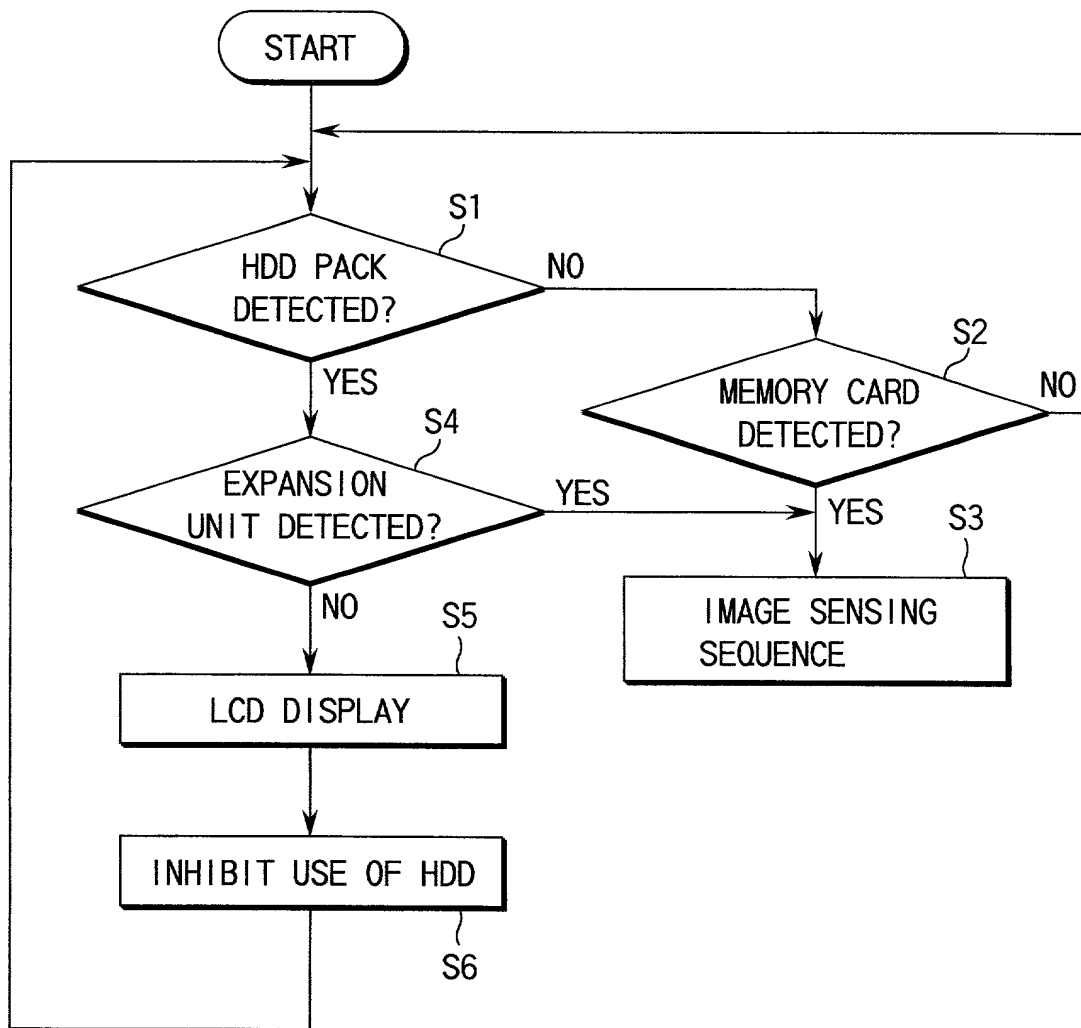


FIG. 8

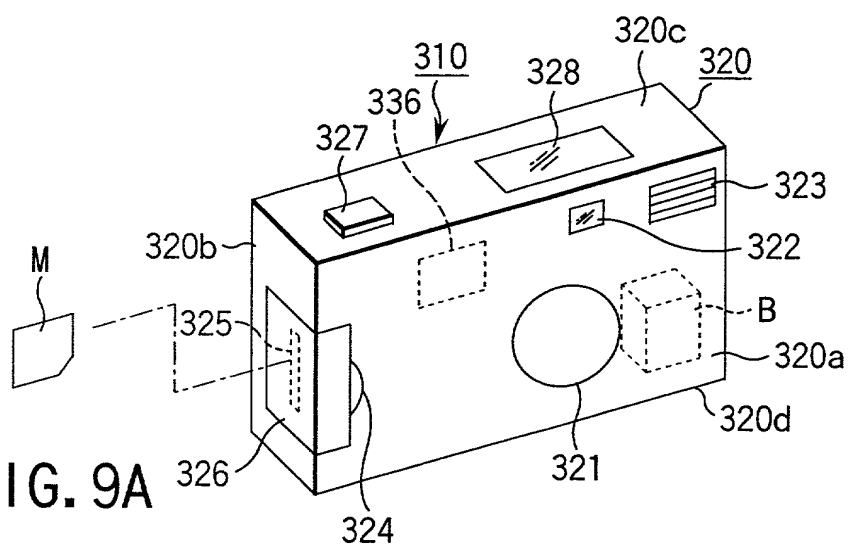


FIG. 9A

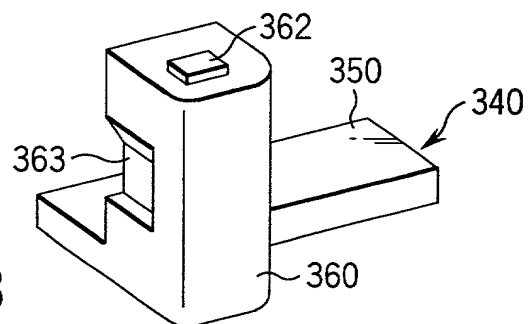


FIG. 9B

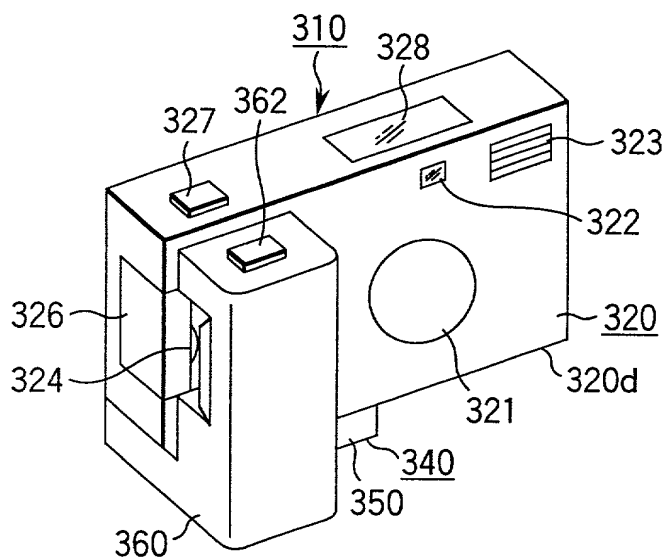


FIG. 9C

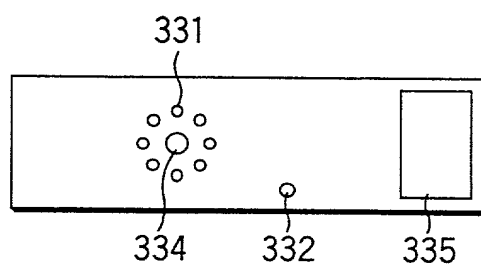


FIG. 9D

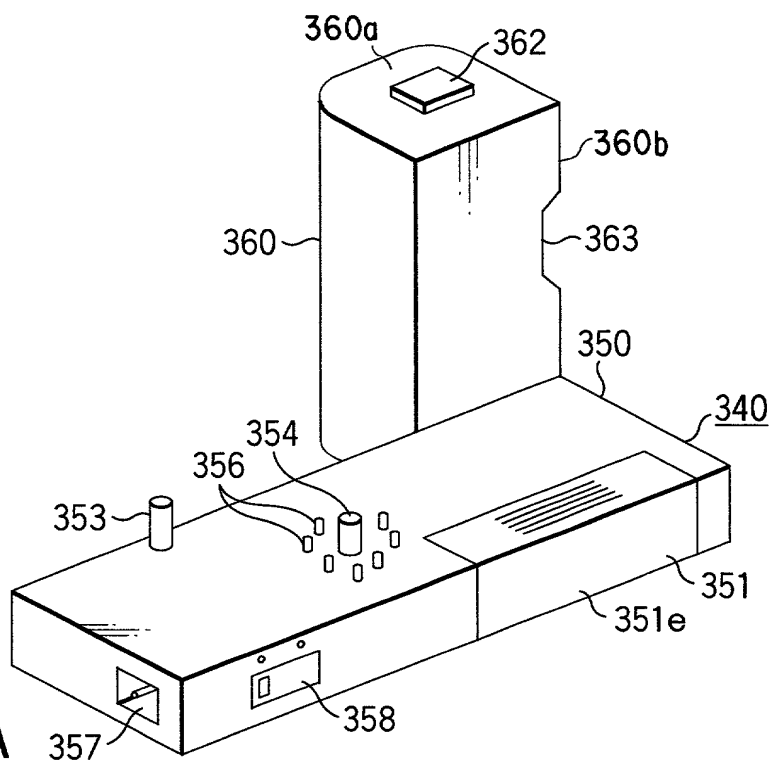


FIG. 10A

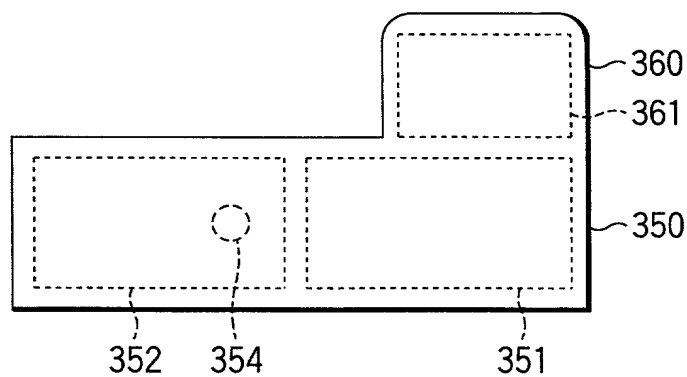


FIG. 10B

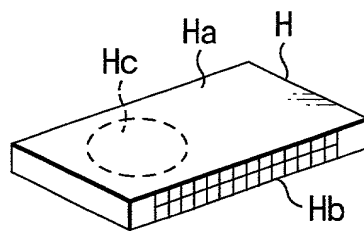


FIG. 10C

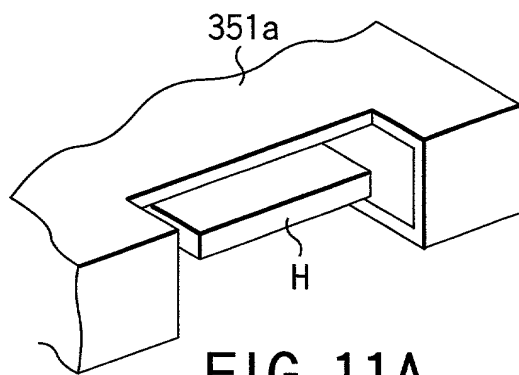


FIG. 11A

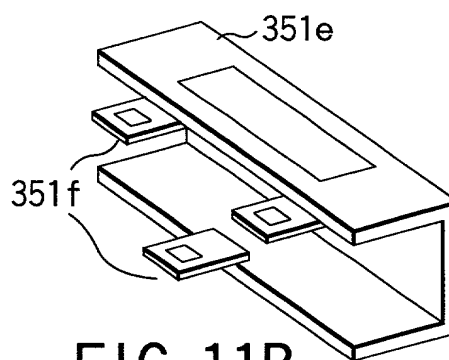


FIG. 11B

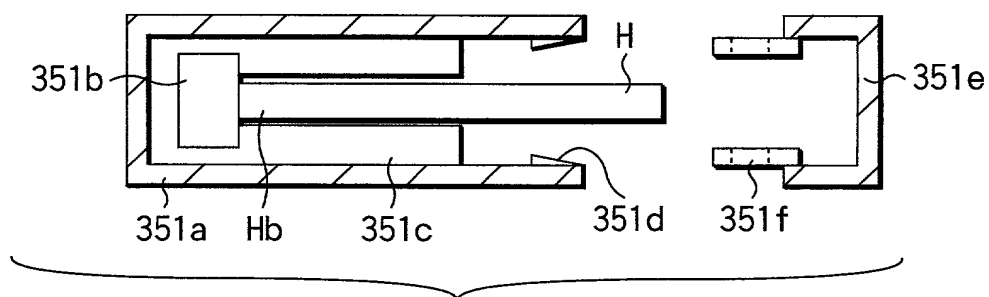


FIG. 11C

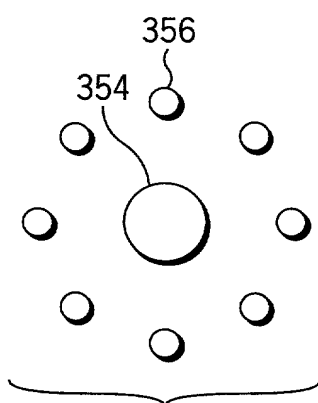


FIG. 12A

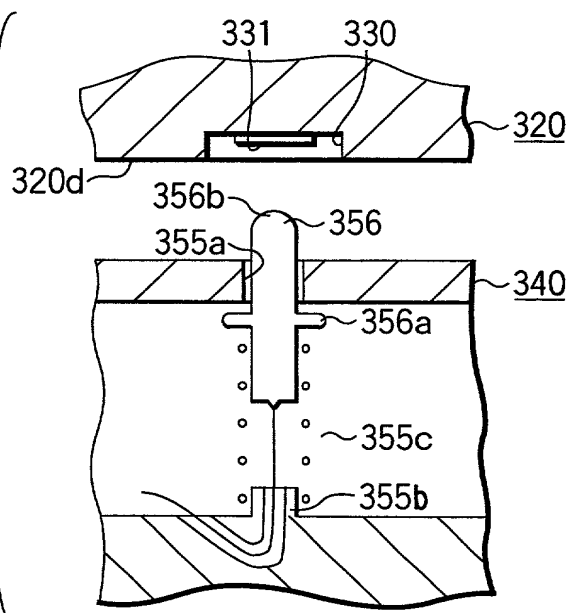
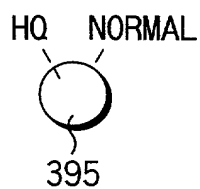
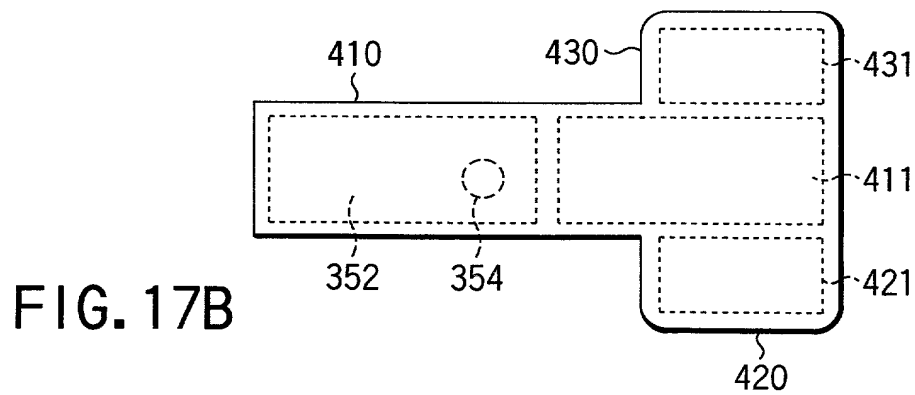
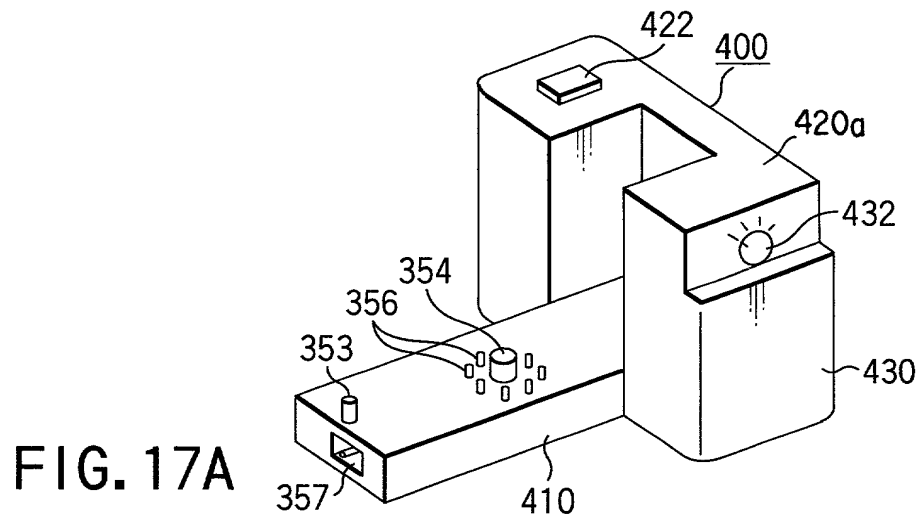
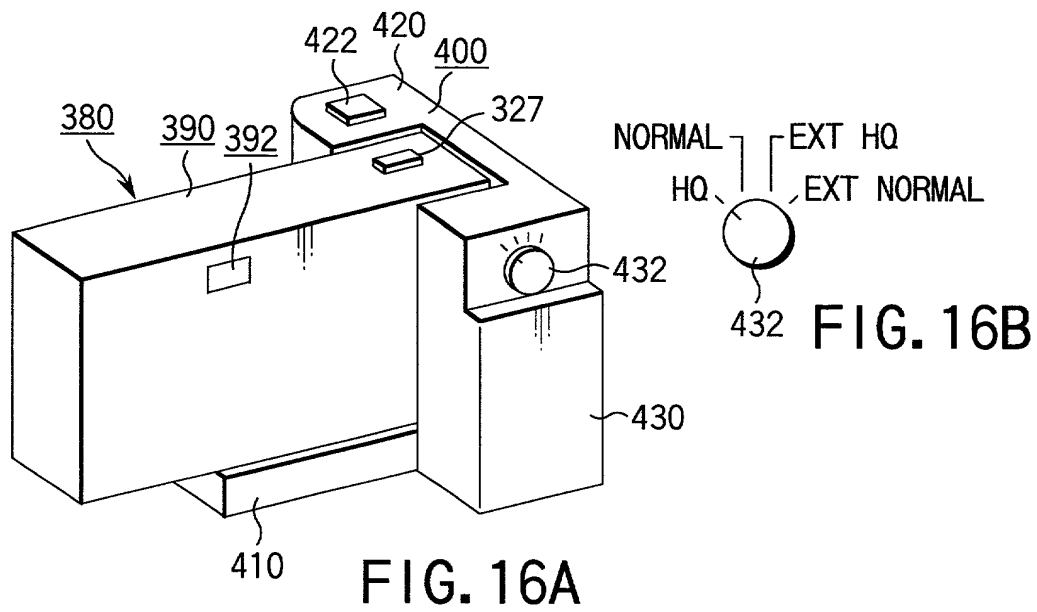
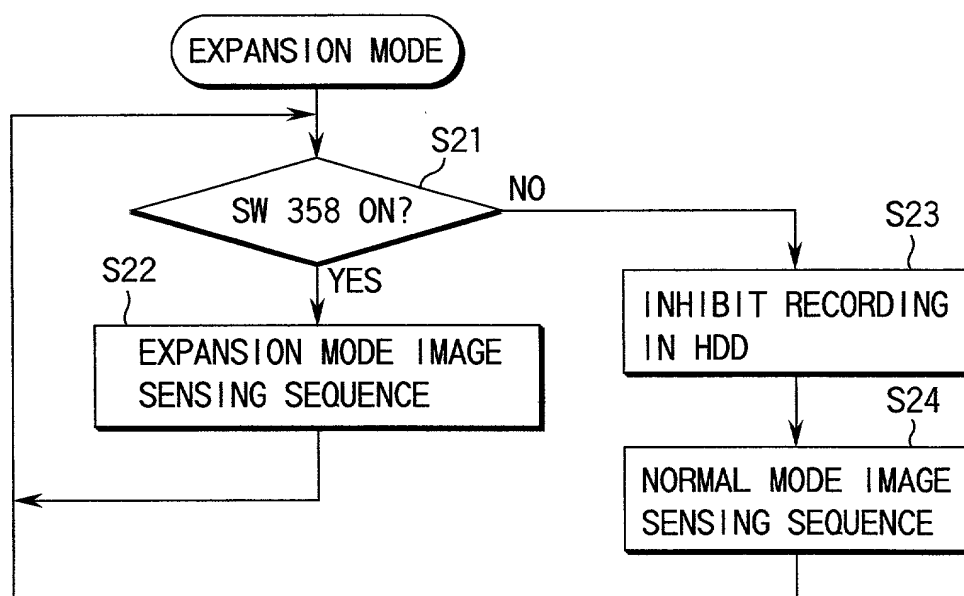
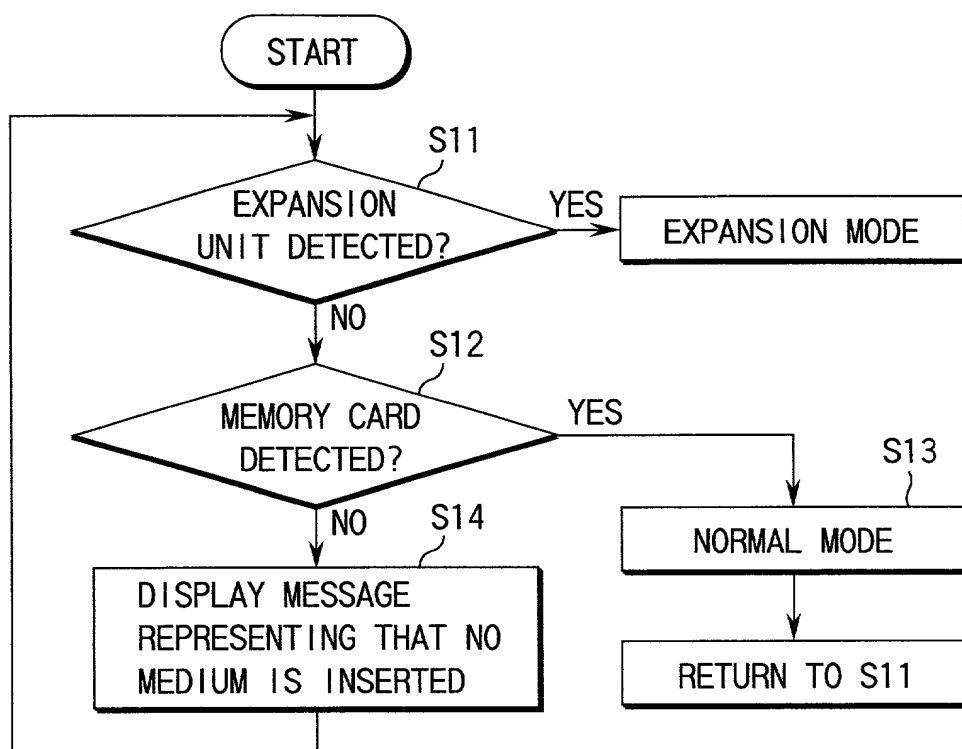


FIG. 12B







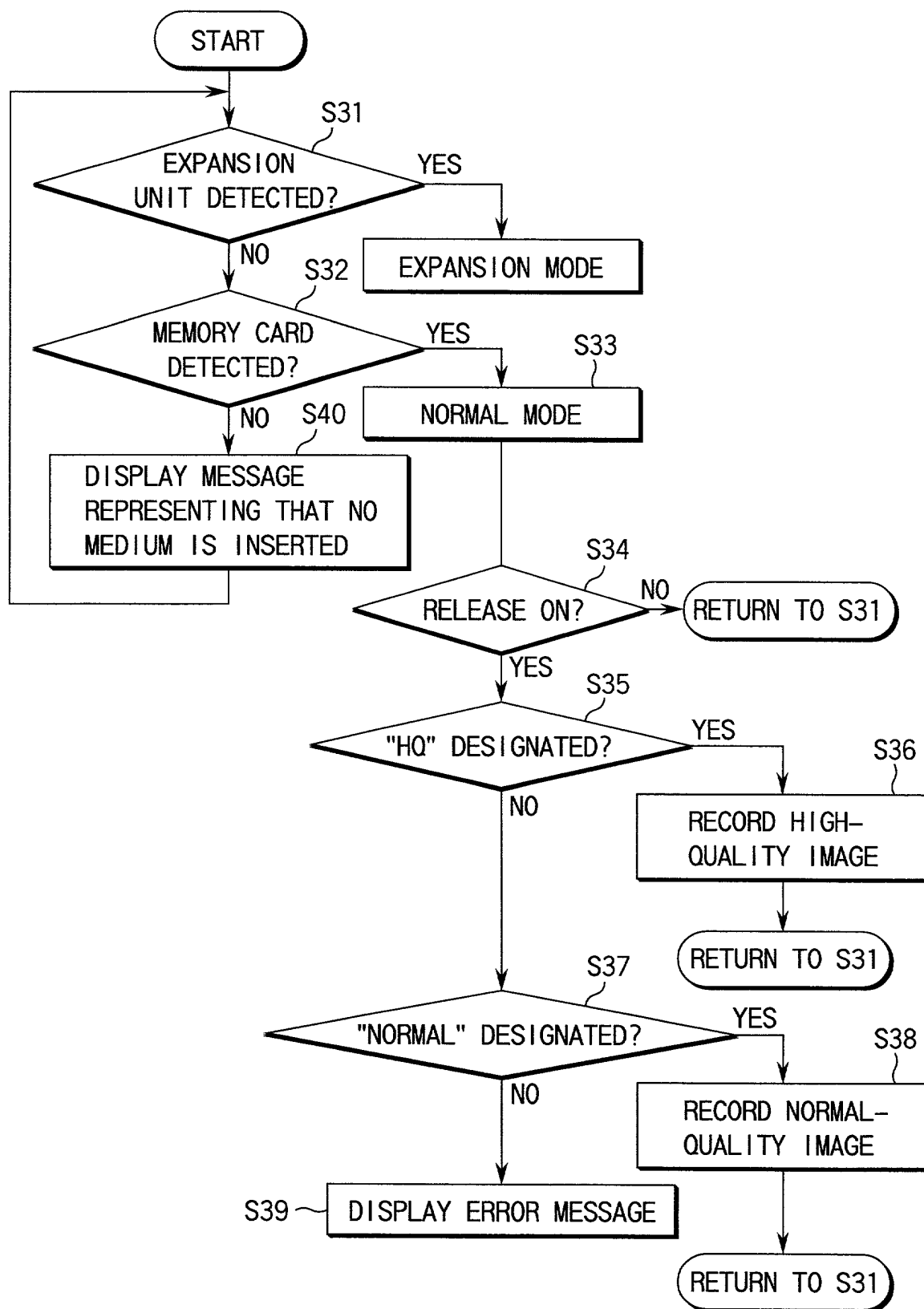


FIG. 21

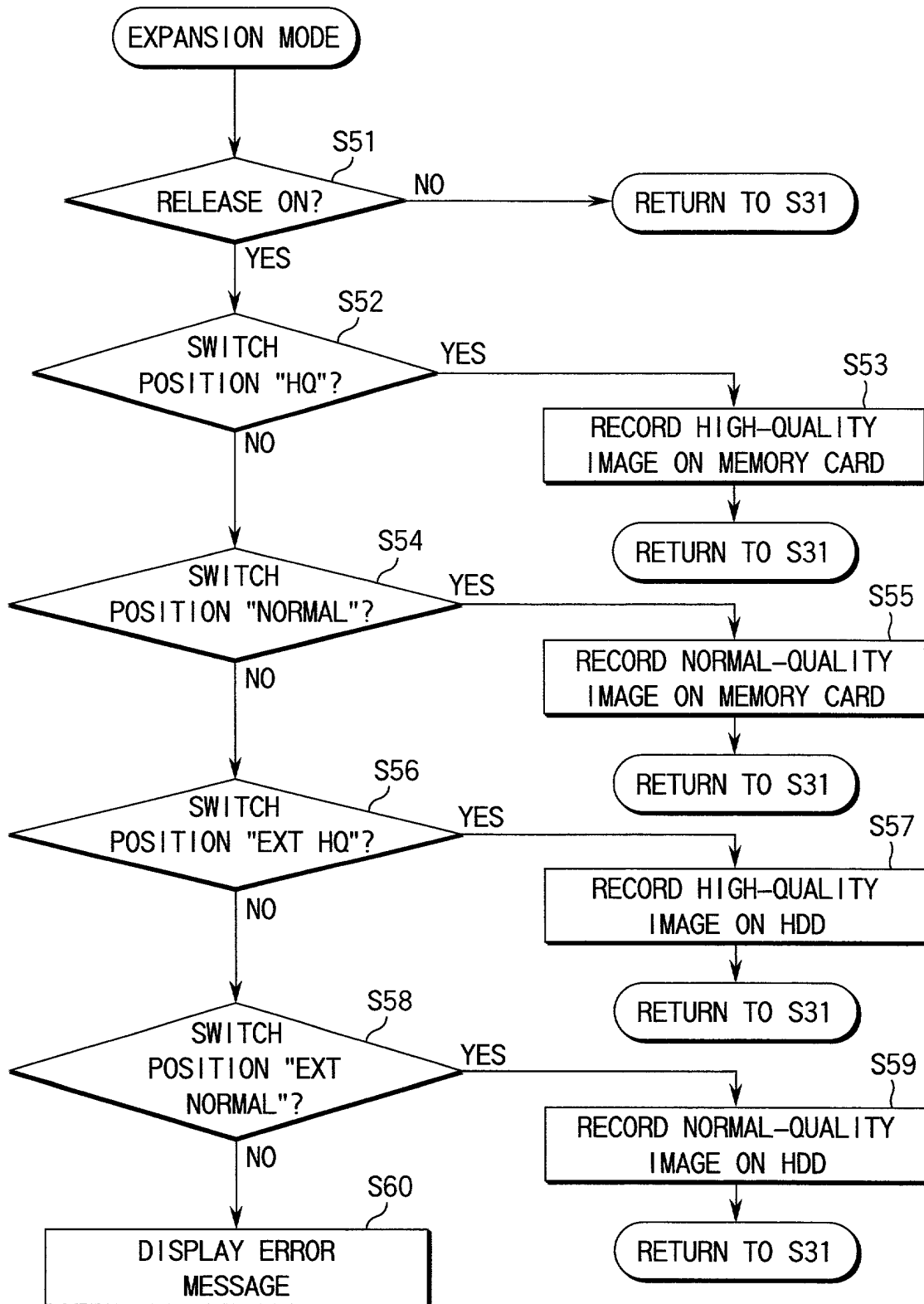


FIG. 22

Declaration Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の横に記載された通りです。

My residence, post office address and citizenship are as stated below next to my name,

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

電子カメラシステム

ELECTRONIC CAMERA SYSTEM

上記発明の明細書（下記の欄で×印がついていない場合は、本書に添付）は、

The specification of which is attached hereto unless the following box is checked:

☐ _____ 月 _____ 日に

提出され米国出願番号または特許協定条約

☐ was filed on _____ as United States Application Number or PCT international Application Number

国際出願番号を _____ とし、

（該当する場合） _____ 月 _____ 日に訂正されました。

_____ and was amended on

_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1条56項に定義されたとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56

OFFICE OF THE ATTORNEY GENERAL

Japanese Language Declaration

(日本語宣言書)

私は、合衆国法典第35編第119条(a)-(d)項又は第365条(b)に基づき下記の、米国以外の国の少なくとも一カ国を指定している特許協力条約365(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT international application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

外国での先行出願

Priority Not Claimed

優先権の主張なし

11-156557 (Number) (番号)	JAPAN (Country) (国名)	03/06/1999 (Day/Month/Year Filed) (出願年月日)	<input type="checkbox"/>
11-156558	JAPAN	03/06/1999	<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

私は、第35編米国法典119条(e)項に基づいて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.)
(出願番号)

(Filing Date)
(出願日)

(Application No.)
(出願番号)

(Filing Date)
(出願日)

私は、下記の米国法典第35編120条に基づいて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約365条(c)に基づく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第37編1条56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) or 365(c) of any PCT international application designating the United States, listed below and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT information application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which become available between the filing date of the prior application and the national or PCT international filing date of application:

(Application No.)
(出願番号)

(Filing Date)
(出願日)

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

(Application No.)
(出願番号)

(Filing Date)
(出願日)

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

私は、私自身の知識に基づいて本宣言書中で私が行う表明が真実であり、かつ私の入手した情報と私の信じていることに基づき、表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

03501002560

Japanese Language Declaration

(日本語宣言書)

委任状：私は、下記の発明者として、本出願に関する一切
の手続きを米特許商標局に対して遂行する弁理士または代理
人として、下記の者を指名いたします。
(弁理士、または代理人の氏名及び登録番号を明記のこと)

POWER OF ATTORNEY: As a named inventor, I
hereby appoint the following attorney(s) and/or
agent(s) to prosecute this application and transact
all business in the Patent and Trademark Office
connected therewith. (list name and registration
number)

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Japanese Language Declaration

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